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Future-Proofing Education for Advanced Practice in Ultrasound: The Perspectives of Clinical Leads in England

Paul K. Miller, Gareth C. Bolton, Lorelei Waring and Lisa Booth



Executive Summary

Context:

- Ultrasound departments in the UK's public health sector have now remained critically understaffed for well over a decade.
- There is a pervasive concern in the contemporary National Health Service that sonographers are moving into Advanced Practice (AP) roles in insufficient numbers to even compensate for early retirements and other premature workforce departures.
- A team of researchers at the University of Cumbria was commissioned by Health Education England to investigate how University curricula and other forms of training might be best adapted to accelerate sonographers' movement into AP roles in the short to medium terms.
- In the service of this, the facility of current educational models/training and their AP-relevant content was explored from the perspective of current Clinical Leads (henceforth CLs) working in English ultrasound units.
- The data underpinning this report were collected prior to the publication of the *Preceptorship and Capability Development Framework for Sonographers* in July 2022, and the updated *CASE Standards of Education* in November 2022. The questions asked and answers given should thus be viewed in this light.

Methodology:

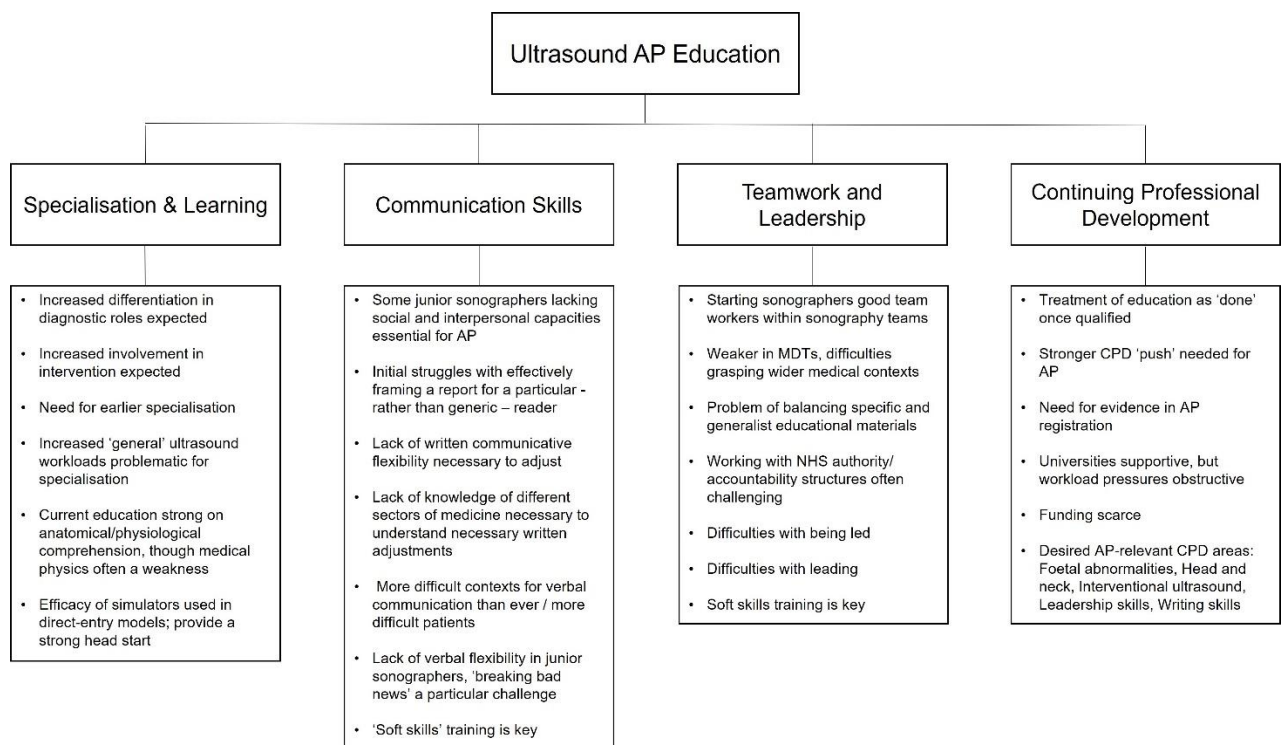
- With institutional ethical approval, N=10 Clinical Leads of ultrasound units in England were recruited, through existing networks. These participants were

based in a variety of regions in England (North West = 4; North East = 2; Midlands = 1; South West = 1; South East = 2).

- Each participant sat for a single semi-structured telephone interview¹, typically lasting between 30 and 60 minutes.
- Interviews were digitally recorded, transcribed verbatim, and redacted of all personally identifying detail at the point of transcription. Redacted transcripts were then thematically analysed.

Findings:

- Analysis revealed four core themes, which are graphically schematised below:



¹ Note: The interview schedule did not in itself actively discriminate between different exit levels of postgraduate ultrasound (i.e. PgC, PgD or MSc), so it can be taken that observations made by participants are pertinent to all unless otherwise explicitly specified.

Recommendations:

- Six key recommendations derived from the findings are made. These are, in summarised form:
 1. There is a need for greater national clarity regarding the competencies and levels of capability that define Advanced Practice, as well as the graduate, enhanced, and consultant stages.
 2. The concept of the four pillars of AP needs to be more extensively familiarised and clarified at all levels of the sonography workforce.
 3. A greater emphasis on developing sonographers' advanced communication skills is needed in both the HEI and clinical settings.
 4. Opportunities to develop leadership skills are needed both within the HEI programmes and locally in ultrasound departments.
 5. More emphasis is needed on training and development opportunities to facilitate sonographers taking-up additional learning opportunities.
 6. The overarching sonography workforce shortage remains highly problematic; attempts to move forward by enabling the existing workforce to develop skills in AP are often hampered by the requirement to prioritise the daily 'bread and butter' workload.

It should be noted that these recommendations are consonant with many key aspects of subsequently published guidance, each thereby further underscoring the case for the other.

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1. Introduction

By the beginning of the last decade, a sustained escalation in demand for ultrasound procedures in the UK had placed increasing strain on National Health Service provision, with many trusts struggling to maintain sufficient numbers of sonographers to provide a fully operational service (Migration Advisory Committee, 2013; Hill and White, 2023; British Medical Ultrasound Society, 2022). In 2014 it was reported that over 18% of positions in UK clinical ultrasound were unoccupied (Society and College of Radiographers, 2014), a circumstance that - if unresolved - posed threats not only for service quality and patient wellbeing, but also for the physical and mental health of sonographers working in the most short-staffed of units (Miller *et al.*, 2019; Bolton and Cox, 2015; Consortium for the Accreditation of Sonographic Education, 2022). These workforce pressures dually require the training of more sonographers *per se*, and the advancement of a greater number of qualified sonographers into Advanced Practitioner (henceforth AP) roles. The two drives are ultimately inseparable if rapid results are required. Simply stated, the greater the range of AP-consonant skills learned during a postgraduate ultrasound qualification, the less the necessary work and investment in subsequent years. The picture of how universities are servicing the drive towards greater number of sonographers seeking an AP qualification remains, however, somewhat opaque. Consequently, this report, funded by Health Education England (henceforth HEE), is centrally charged with (a) consolidating knowledge around what is (and is not) currently working in the contemporary territory of Ultrasound AP development in England, and (b) anticipating the educational developments that are likely to be required in the short to medium term.

As a contextualising note, it should be observed that the data addressed in this report were collected prior to the publication of the *Preceptorship and Capability Development Framework for Sonographers* (British Medical Ultrasound Society, 2022), and the updated *CASE Standards for Sonographic Education* (Consortium for the Accreditation of Sonographic Education, 2022). Emergent findings will not, therefore, necessarily reflect all of the additional concerns and pressures that have emerged since this point, not least as a consequence of the Covid-19 pandemic.

1.1. Ultrasound Education in the UK

Historically, the UK's ultrasound workforce had been largely supplied by graduates from allied healthcare professions (overwhelmingly radiographers) who took time out of their extant roles to pursue a specialist postgraduate qualification in sonography on a full-time or part-time basis. As noted by Waring et al. (2018), however, this *status quo* was largely reliant upon the assumption of a fully staffed radiography profession. By 2009, however, front-line radiography had itself become subject to shortages of staff, in turn delimiting opportunities for established radiographers to pursue new career options. Moreover:

- Ultrasound training posts were indivisibly positions of employment, with high combined course fees and salary across the training period (of typically 18 or 24 months).
- Staffing 'backfill' was often required to ensure service delivery was maintained, adding further costs, and where backfill funds were not available a further workforce deficit could emerge.

- There was no national approach to sonography training, and funding was chiefly left to local NHS Trusts. There was, thus, no guarantee that the trainee would remain in the funding trust once qualified.

Given this combination of circumstances and factors, it became clearly recognised that the established model of “postgraduate education for medical imaging graduates leading to a CASE accredited award” was no longer able to supply the numbers of sonographers necessary to meet NHS demand (Society and College of Radiographers, 2009; Parker and Wolstenhulme, 2012; Martin, 2015). In response, a range of strategic interventions in UK Higher Education (henceforth HE) were proposed to help arrest this recruitment slide and begin to rebuild the UK's numbers of working sonographers (Waring, Miller and Sloane, 2015). Primary among these were three new models of delivery:

1. The Direct-Entry Undergraduate model (henceforth DEUM), an undergraduate programme specifically focused upon ultrasound. Analogous to the established BSc. in Diagnostic Radiography, the pathway would be open to applicants with acceptable grades at A-level or equivalent.
2. The Direct-Entry Postgraduate model (henceforth DEPM), a postgraduate programme open to graduate applicants without prior experience in a medical imaging or pertinent allied health field.
3. The 3+1 Postgraduate (henceforth 31PG) model, in which higher-achieving Diagnostic Radiography students would be offered the opportunity to carry on for an extra year after the completion of their BSc. to gain a postgraduate ultrasound qualification.

These models were not met without caution at the time of their proposal, with concerns raised within clinical ultrasound regarding how extant staffing standards

might be fully maintained. These were particularly strongly articulated around the lack of prior clinical experience that would likely accompany applicants to the DEPM, while a potential lack of maturity and workplace-readiness among the likely younger graduates of the DEUM was also a point of contention (Waring, Miller and Sloane, 2015). Nevertheless, it remained clear that the established educational model could no longer sustain the workforce on its own (Society and College of Radiographers, 2009; Martin, 2015; Parker and Wolstenhulme, 2012), and in 2016 the first programmes based on the new models were rolled out in British universities.²

The current (albeit limited) research evaluating the early impacts of these new programmes, particularly those of the DEPM format, certainly indicates that the potential pitfalls noted above have not transpired to be an issue, and that the new models appear to sit comfortably alongside the old in contemporary ultrasound education (Bolton *et al.*, 2019). While there are no completely reliable data available regarding sonographer numbers in the UK between 2014 and 2019, meanwhile, self-selecting responses to a SoR census indicated that the proportion of unfilled ultrasound posts declined from around 18% to around 13% (Society and College of Radiographers, 2019; Society and College of Radiographers, 2014). At this point, the degree of impact that new HE programmes may have had upon this statistic is unclear. It is evident, however, that while the number of unfilled posts

² The first DEPM programmes opened at the University of Cumbria in January 2016 and the University of Derby in September 2016. The first - and at time of writing only - DEUM programme has been running at Birmingham City University since September 2016, while Leeds University currently delivers the only 31PG programme.

remains highly problematic for ultrasound services and their staff alike, at least some of the pressure has been eased in recent years.

1.2. The Advanced Practice (AP) Role in Ultrasound

Contemporaneous to the development of these new models of core ultrasound education, and similarly tasked with helping address increasing demand on the healthcare workforce, was the establishment of a multi-professional framework (Health Education England, 2017) for Advanced practice (AP) roles in England. This "...requires that health and care professionals working at the level of advanced practice should have developed and can evidence the underpinning competencies applicable to the specialty or subject area, i.e. the knowledge, skills and behaviours relevant to the health and care professional's setting and job role" (Health Education England, 2017, p.6). Fundamental to the framework is a set of four 'pillars' around which core capabilities need to be organised:

1. Clinical Practice
2. Leadership and Management
3. Education
4. Research

Although the pillars themselves are taken to be essential across professions, their application to specialist competencies is flexible. This is to say that application "...may be manifested/demonstrated in different ways depending on the profession, role, population group, setting and sector in which an individual is practising" (Health Education England, 2017, p.6).

While sensitive to the differences between professions, it is arguable that this specificity can produce a very particular problem for ultrasound education in universities. Although undergraduate programmes have come online in recent years, as noted above, ultrasound remains overwhelmingly a graduate profession in England at least (Waring *et al.*, 2018). In these terms, it is seldom possible to begin preparing future practitioners for some of the more specialist competencies necessary in ultrasound AP at the outset of an undergraduate degree, as may well be feasible in other healthcare domains. Rather, the skills in question need to be developed in the more compressed (and pressurised) postgraduate environment. Consequently, universities are faced not only with questions of 'what' around stimulating AP advancement, but a particularly nuanced 'how'.

1.3. Objectives and Aims

It is evident that ongoing monitoring of the relationship between the needs of clinical practice and training structures and activities in HE is an essential component in mitigating recurrence of past workforce problems (Sloane and Miller, 2017). In the service of this, and given the concerns around ultrasound education and AP development thus far outlined, the stated project aims are as follows:

1. To explore the facility of current educational models/training and their AP-relevant content from the perspective of current Clinical Leads (henceforth CLs) working in English ultrasound units.
2. To thereby elucidate the changes that CLs view are needed now, and the further changes that will likely be needed, to future-proof curricula and other training in the short to medium term, in order to accelerate sonographers' movement into AP roles.

2. Methodology

In order to meet the core aims of the project a programme of extended, semi-structured interviews with N=10 CLs in English ultrasound units was conducted. All principles and procedures governing these investigative activities are outlined in the sections below.

2.1. Participants

With full institutional ethical approval, participants were recruited through existing professional networks. A general invitation to participate was sent via email to a range of prospective candidates, and the first ten to respond were selected to take part in recorded telephone interviews.

As evidenced in Table 1, recruitment was in line with projected numbers (N=10). The recruited CLs were based in a variety of sites across England (North West = 4; North East = 2; Midlands = 1; South West = 1; South East = 2).

TABLE 1: PARTICIPANT DEMOGRAPHICS

		Age (Years)		Years in Current Role		Years as CL	
Gender	N	M	SD	M	SD	M	SD
Female	6	47.00	6.81	9.83	6.79	11.67	5.65
Male	4	40.00	8.41	6.75	4.79	8.50	5.20
Overall	10	44.20	7.90	8.60	5.99	10.40	5.24

2.2. Procedure

Prior to data collection commencing, a semi-structured interview schedule was prepared for the participants (see Appendix 1). This was organised around a series of central broad and open inquiries with subsidiary topical 'prompts', based upon project aims and related literature, rather than a rigid set of pre-defined questions. In this manner, it facilitated a certain degree of substantive standardisation between interviews, but also encouraged participants to develop upon their unique experiences with reference to concrete examples (Miller, Booth and Spacey, 2019).

Selected participants were sent a Participant Information Sheet and Consent Form (see Appendix 2) to read/complete prior to their telephone interview being formally scheduled, plus a short précis of the topics that would be addressed in the interview itself (see Appendix 3). The latter approach has been robustly demonstrated to facilitate stronger participant reflection on specifics (rather than generalities) prior to the interview itself, while also potentially setting them at greater ease regarding interview content and procedure (Miller *et al.*, 2017). Once written consent to participate was received, interviews were scheduled at a time of the participant's choosing.

All interviews were conducted via telephone and digitally recorded. Audio files were transcribed verbatim but are reproduced in this report with necessary deletions/replacements for (a) protection of participant identity, and (b) clarity of reading wherever practically possible. These adjustments include:

- Proper names.
- Specific dates and times.
- 'Minimal continuers' (Miller and Richardson, 2017), such as 'uhm', 'erm' and 'err'.

- Word repetitions, coughs and stutters.
- Aborted or reformulated sentence starts.
- Linguistic idiosyncrasies, such as 'kind of like', 'you know' and 'sort of'.

The interview schedule did not in itself actively discriminate between different exit levels of postgraduate ultrasound (i.e. PgC, PgD or MSc), so it can be taken that observations made by participants are pertinent to all unless otherwise explicitly specified in the Findings below.

2.3. Analysis

Analyses of qualitative data were built on the widely-trusted and highly transparent Braun and Clarke (2006) six-step model for reflexive thematic investigation: data familiarisation; generation of initial codes; thematic searches; review of identified themes; defining/redefining and naming these themes; and writing up the report. This is an inherently recursive process, encouraging retroactive attention to the various prior stages as necessary, in order to optimise the trustworthiness of the overall analysis (Christie *et al.*, 2016).

Following manual review of the transcribed data set, grounded coding was developed. The codes were then grouped into sub-themes and synthesised into core (global) themes describing the participants' concerns.

3. Findings

It should be stressed from the outset that participating Clinical Leads were overwhelmingly content with the skills and training of new sonographers coming into their workplaces to perform general ultrasound roles. They did, however, also highlight some areas pertinent to prospective AP specialisation and accreditation in which newer recruits routinely did not perform as well as they might have in the past, and some other key barriers to AP development. With respect to this, analysis of the data revealed four core themes: (1) Specialisation and Learning, (2) Communication Skills, (3) Teamworking and Leadership, (4) Continuing Professional Development. The relationship of these themes with key subthemes is schematised in Figure 1.

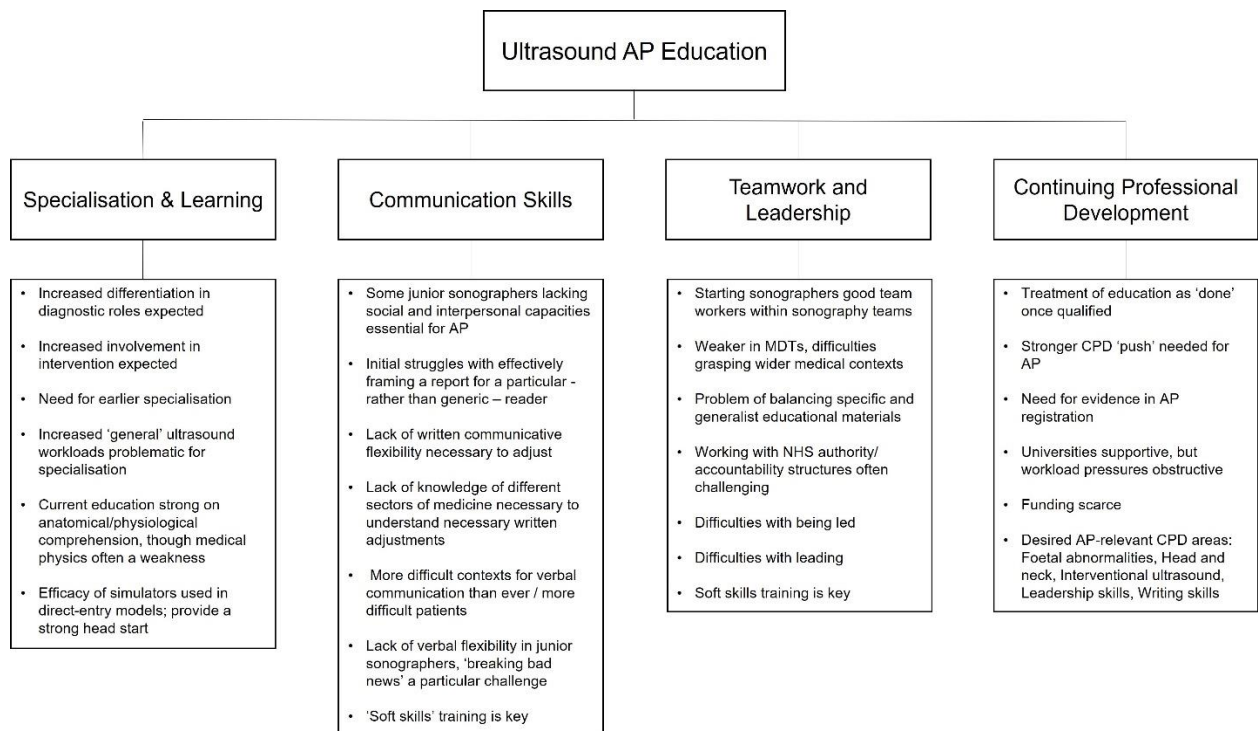


FIGURE 1: THEMATIC MAP

Below, the embedded issues are further explored with reference to key examples from the qualitative dataset throughout.

3.1. Specialisation and Learning

All CLs pointed to the manner in which modern APs will need to be prepared for a greater range of diagnostic and specifically *interventional* tasks, and also to be working in more specific domains than may have been the case in the past. This issue is exemplified herein:

CLP4: *"I think intervention's going to be the way forward. I also see that sonographers are going to need a bit more in depth knowledge of cross-sectional imaging as well. So, one of the things that we're doing at the [Annual Scientific Meeting] in December is to, have some lectures dedicated to cross-sectional imaging for sonographers, and, we, we have got sonographers now, for instance, who are experts in prostate. And they started off, you know, learning all the physiology, everything that goes around the prostate, imaging the prostate, then biopsying the prostate and now they're reporting MRIs of prostate, so now they're a prostate expert rather than an ultrasound expert."*³

This sense of specialising was key to many CLs' requirements regarding what universities might provide. However, the same drive towards diversification of role and specialisation of skillset(s) in AP was always attenuated by a concern regarding ever-increasing workload in 'general' ultrasound:

CLP3: *"[Sonography is] your inexpensive, accessible modality and as such we're going to get more and more of a push for ultrasound. [P]atient's lifestyles are*

³ Note: Some interventional directions may (at time of writing) be inaccessible to Direct Entry sonographers, due to 'Sonographer' remaining an unprotected title in the UK, and sonographers therefore being ineligible for HCPC registration unless already registered with a regulatory body via a previous qualification.

becoming more and more unhealthy. People are living longer. So that workload's only ever going to increase."

Given these apprehensions, none of the participating CLs posited a mechanism by which more junior sonographers might be more effectively prepared for a potentially rapid specialisation of their role against a potentially paradoxical backdrop of early-career workload pressure. Indeed, they were broadly clear that fully effective AP competencies might only emerge as a consequence of full engagement with ongoing, post-university Continuing Professional Development (henceforth CPD, see section 3.4), which might itself be stymied by high workload. This can be seen as a potential point of paralysis; how can the classical entry to ultrasound (i.e. postgraduate) both teach entry-level ultrasound skills and readiness for a specific interventional pathway in two years? Several key observations emerged, however, regarding how extant work in HEIs was proving useful in the AP domain.

Critically, none of the participating CLs actively faulted the core scientific content of the conventional or direct-entry programmes in terms of students' anatomical/physiological (pillar 1) comprehension.

CLP8: *"So, the [universities] have delivered there...it shows in their knowledge of anatomy and complex situations, really."*

Moreover, and possibly counter-intuitively, the anatomical simulations that had been used in direct-entry courses to nominally 'catch-up' those students were seen as actually giving them an advantage in terms of flexible readiness for the clinical demands of the prospective ultrasound workplace.

CLP1: *“One thing I have noticed is that the students that we have on the direct entry course, because they spend so much time on the simulator in the University before they get to us, that’s definitely been beneficial, we could increase that a little bit. We see a massive difference in those students compared to the students on the traditional route.”*

One key area in which some CLs voiced a concern about new charges’ capacity to move beyond their immediate education, however, related to the business of medical physics. In this respect, they were certainly more actively concerned about the capacities of direct-entry students who might over-rely on technical directives given a lack of prior experience in human medical imaging contexts:

CLP2: *“[They] are missing some of the hard science behind why things are needed for certain examinations and why they’re, why the, how to adjust, say, their preset to get the, the best quality image and they’re being governed too much now by the, the enhanced features on new equipment coming out where, you know, there’s no requirement to have to adjust the focus or adjust other clinical features because it’s built into a preset and they just pick up a preset and work to it instead of being able to actually adapt it based on the patient.”*

Given all of the above, however, the CLs’ stances on the consequences of starting more specialised ultrasound pathways in HE are typified by **CLP1:**

“[T]raining sonographers for specific roles...that would lead to shorter training periods but...at the end of that, they would be very limited at what they could actually do. How beneficial that would be in a clinical environment, it’s difficult to say.”

3.2. Communication Skills

Regarding skillsets, a dominant observation made by all CL participants was that a significant number of the more junior sonographers in the present workforce – and

particularly the most recent recruits – appeared to lack some of the social and interpersonal capacities that (a) their forebears had not, and (b) would be essential qualities for a future AP. This was typically explained in terms of such recruits having lower levels of on-the-ground clinical and/or wider life experience; moreover, it was widely agreed that the situation would likely become more acute in forthcoming years as increasing numbers of new sonographers came into practice via direct-entry programmes. As such, a consensus emerged that ultrasound programmes in HE might adapt to more integrally promote skills that might have previously been (perhaps disparagingly) labelled “soft,” yet are instrumental to pillar 2. The broad issue of communication was deemed key within this, and itself addressed with respect to two main forms: written (largely in the form of reporting) and verbal. Regarding the former, it was widely contended that new sonographers (from any educational trajectory) initially tended to struggle with effectively framing a report for a particular - rather than generic - reader.

CLP5: *“[As] sonographers, we scan patients, we identify pathology, and we write a report to interpret the findings in a language which is understood by the intended recipients and, depending on who the referring clinician is, determines how we write the report. So, you know, if we were writing a report for a GP, we would write it in much simpler, simpler terminology, you know, not wanting to sound patronising, than we would do if we wrote to a consultant GI physician.”*

In short, current ultrasound graduates were deemed to be unprepared for key pillar 2 concerns, showing:

- (a) A lack the flexible communicative “repertoires” necessary to adjust, and/or;
- (b) A wider knowledge of different sectors of medicine necessary to understand what kinds of adjustment might be necessary.

These issues are articulated by **CLP1** (below), who again speaks to the difficulty of squaring what is ideal with what is pragmatically possible.

CLP1: *"[A]lthough they can report, they are reporting the examinations when they first qualify, they are very, the word 'green' sort of speaks and they are inexperienced and it's having that depth of knowledge and medical knowledge and medical systems...to be able to issue a report [and] to give instructions to particular clinicians either for further imaging or directions for further referral, and I think that in that respect perhaps newly-qualified sonographers lack."*

This was highlighted as being a problem particularly (though not uniquely) affecting direct-entry sonographers, who may not have had extensive prior hospital experience. This would thereby limit their practical knowledge of how other healthcare professionals operate when compared to a sonographer who had previously qualified in a domain of Allied Healthcare (such as diagnostic radiography). In these terms, their capacity to move towards AP status was stymied from the outset. In some hospitals, however, help with reporting was an essential element of ultrasound preceptorship and ongoing training.

CLP6: *"[T]hey're not quite ready...at that point, they need some help with sort of, report writing, they need some, sort of help with dealing with some of the more complex cases that they come across."*

CLP2: *"[We] offer them support and training to get them to the level of reporting skills that we need them to be at, given the context and work that we have."*

The necessity for a modern AP sonographer to be reporting (and experiencing problems with reporting) was, however, also acknowledged to be a distinctly contemporary phenomenon.

CLP4: *"[W]hen I started we were ticking boxes, we weren't even writing reports really, you know, we used to have a radiologist to look over the top of us, sort of manage the lists."*

In terms of verbal communication, meanwhile, some analogous problems were identified around new sonographers' interactions with patients. With respect to this, it was identified by all participants that the business of talking to patients was more inherently fraught with difficulty now than it may have been in the past.

CLP1: *"[P]atients are becoming more demanding...Due to the internet, they've got more access to medical information. [T]hey almost research everything before...and sometimes I think that's quite a challenge for newly qualified sonographers. I can only see that will get worse."*

CLP6: *"I think, patients are becoming much more savvy and much more demanding sometimes. They're...no longer sort of happy just to be patted on the head and told to, you know, it's fine. [Now] they want tests, frequently."*

This situation was not taken to be undifferentiated, however. **CLP1**, in particular, drew attention to a difference in attitude between contemporary obstetric patients and others:

CLP1: *"Obstetric patients are probably the most demanding patients that we see. And the main reason for that, is they're not unwell. So, any patients that are attending for screening, definitely have a low tolerance for things like, you know, long waiting times and that kind of thing, whereas a patient that's sitting in the waiting room, wondering if they've got cancer...[Obstetric patients] never expect that we're going to give them bad news, you know, it is just the nature of that cohort of patients. They have a very low tolerance if they don't get what they want from us, you know, they're not afraid to complain...Your medical patients, your non-obstetric patients, very, very different attitude...they're here because they're worried and they want to get to the bottom of something."*

Given the above, it was widely contended that sonographers needed stronger verbal skills than ever before, but that recent graduates often struggled with more challenging interactions such those involved in the breaking of bad news. As with

reporting, these problems were often aligned with a difficulty in judging how best to relay information to a *specific* individual. In short, with contextual assessment:

CLP10: *"[More training is needed around] communication skills definitely...and breaking bad news, and I suppose knowing the next steps for that patient, as well as being open with them."*

CLP6: *"[Sonographers are] going to have to learn a lot more how to talk to patients, how to be able to discharge patients. I mean, many of our pathways now in [city name], if I could give you an example, the two-week wait testicular pathway, people with suspected testicular cancer, these were all going to urology and then urology would send them down for an ultrasound to us and the vast majority were, were perfectly normal. So, we've changed that pathway now, and now, we take referrals for, for suspected testicular cancer. We'll scan them in our department, and we'll discharge them, and we'll only refer on the ones that need referring. Now that saves Urology, you know, a huge number of clinic appointments because the vast majority of those patients they don't need to see. But it does mean, on the part of that sonographer, they need to know how to discuss those results with that patient, and to be confident to discharge them."*

While some participants emphasised the potentially positive role of education and further training in enhancing the ability of new sonographers to effectively communicate in difficult situations, it should be noted that others were less optimistic:

CLP2: *"Whether or not they fully ready, unfortunately that comes down to the individual rather than having anything specific to do with the education, there's always going to be people who take difficult situations in their stride and other people who are always going to struggle with it, but I don't think there's much else that can be done from an academic point of view."*

3.3. Teamworking and Leadership

Although sometimes couched as "soft skills" (see sections 3.2 and 3.4), participating CLs routinely drew attention teamworking as a key element of modern AP

sonographic practice, though they made no explicit reference to its status as a 'pillar 3' concern. Broadly speaking, new sonographers from any degree pathway were seen as good team-workers *within* medical imaging departments themselves. They typically were viewed as entering clinical ultrasound with a strong understanding of the field itself, the everyday work patterns of colleagues and, therefore, how to work effectively with other sonographers. Given a progressive move towards greater diversification of role within contemporary healthcare (also addressed in section 3.1), however, and more frequent corollary *extra-sonography* interactions, the ability to effectively integrate in multiple team scenarios was foregrounded as an increasing (and potentially problematic) necessity.

CLP6: *"I think teamwork is often good within individual imaging departments. It's kind of extending that out, and making sure you have those relationships, and to develop those relationships you, you know, we have to be more flexible. So, you know, we have to, it's a case of you scratch my back, I'll scratch yours. So, you know, so frequently hepatologists will say, well we're a bit worried about this chap, can you see him on your list today please and I'll say, yes, that's fine but you know, quid pro quo, I can phone them and say I'm a bit worried about this person, can you see him in your clinic please? It's that kind of, and that's what really works for the patient, so that everything is done in a really informal way, where you can get things done quickly, you'll then need to but you'll have to be embedded within a team to do that."*

As similarly identified in section 3.2. above, thus, *ad-hoc* flexibility and strong understanding of the working lives of other healthcare professionals was deemed to be of increasing essence. This was ultimately identified as another quandary regarding university oversight, however; how can a programme simultaneously provide a full understanding of ones' own domain and that of others concurrently?

A further aspect of teamwork raised by participants related to the multi-faceted issue of leadership. Firstly, a persistent problem was identified by some

relating to understanding of the processes of leadership within the NHS itself: new sonographers can be challenged by how to work within existing authority and accountability structures.

CLP2: *"[New sonographer] deficiencies are usually things like an awareness of...NHS policies and procedures and a little bit of, you know, leadership roles and leadership responsibilities."*

Moreover, and as eruditely summarised by **CLP7**, leadership for an early-career sonographer is not only a matter of understanding "who is in charge" and how to work with that:

"[New sonographers need] to understand how they can lead their colleagues, how they can lead themselves, you know, how they fit into that workplace role, as opposed to just learning to scan."

Given UK-wide staffing shortages in sonography, and an enhanced focus on research in many contemporary ultrasound degrees, it was noted by some CLs that early-career sonographers may well find themselves in positions of personnel management or research leadership rather more quickly than they may have anticipated.

CLP5: *"[T]hey have to go away and, you know, do audit, research, outside of their work time, then also they may need to provide some elements of leadership and management either by absence deputising, or, you know, leading novice sonographers or trainees."*

In these terms, a clear understanding of how to position oneself as a leader of individuals within a given team is now an imperative even for the most junior of sonographers.

3.4. Foregrounding Continuing Professional Development

Finally, a matter routinely raised by the participating CLs related to the matter of CPD. There was some concern that an ultrasound qualification was viewed by some recent graduates almost as a 'one-and-done' commitment to formal, structured learning in the domain at least in the shorter term, and sometimes for longer.

CLP2: *"Newly qualified staff, some of them just want a break from learning and they...want to, find their feet doing the role that they've currently trained to do and want to embed in that properly before they even consider then doing anything else. And then some people just don't want to do anything on top of what they're already doing."*

As such, there was unanimous assertion that the *continuing* aspect of CPD might be more effectively 'pushed' from the very outset of ultrasound training if AP was a goal. This was taken to be of particular importance given:

- a) The increasing contemporary diversification and specialisation of roles outlined in sections 3.2. and 3.3 above, and the corollary need to constantly take-on new knowledge and skills in a methodical way;
- b) The relatively new need in ultrasound to submit evidence of engagement in order to gain and *maintain* AP accreditation.⁴

⁴ Note: This would only apply where the sonographer had previously qualified as a radiographer, or other statutory registered healthcare professional.

Indeed, the latter was taken to have helped support the former across the profession as a whole:

CLP1: *"I definitely think the fact that we've got to submit evidence now for [AP] registration [accreditation] has definitely made, you know, staff take things a lot more seriously in regards to things like keeping their portfolios up to date and profiles and things like that."*

Typically, participants were happy with the quality of CPD support in universities, though ability to fund CPD varied and general workforce pressures were seen as an obstacle to engagement across-the-board.

CLP1: *"We're fortunate because we're fully staffed, so that gives us enough scope to get people out and about on these courses but I do think that in some departments probably the biggest barrier isn't even funding, it's more staff having time to go to these things, just because of the workforce pressures that we've got at the moment."*

A few suggestions were, however, ventured regarding the range of dedicated CPD courses that would be increasingly useful for their staff in the changing ultrasound environment. Some of these were technical/clinical, some of the more 'social' orientation. Whichever the case, they ultimately reflect CLs' concerns around areas in which present ultrasound graduates might require 'top-up' knowledge if they are to rapidly proceed towards AP status. These are summarised in Table 2.

TABLE 2: CLPs' CPD COURSE 'WISH LIST'

Dedicated course topic	Participants
Fetal abnormalities	CLP1; CLP3; CLP4; CLP7
Head and neck	CLP2; CLP3; CLP5; CLP6; CLP9

Dedicated course topic	Participants
Interventional ultrasound	CLP2; CLP5; CLP6; CLP7; CLP8; CLP10
Leadership skills	CLP1; CLP2; CLP4; CLP5; CLP6; CLP7; CLP9; CLP10
Writing skills	CLP1; CLP2; CLP3; CLP4; CLP5; CLP6; CLP7; CLP9; CLP10

4. Conclusions and Recommendations

A range of concerns were raised by participating CLs regarding how universities might help address the movement towards greater AP qualification in an evolving ultrasound environment. Some were concerned with how both essential education and subsequent CPD should address the inevitability of greater technical specialisation and intervention capacity. All, however, addressed the pertinence of nominally 'soft' skills in the service of these changes, not least those involved in communication, teamwork and leadership.

It was telling, in many respects, that there was a genuine mystification among most CLs when the 'four pillars' of AP qualification were raised in interviews. Even where the principle was understood, however, it was typically seen as a theoretical construct that bore limited relevance to everyday practice and development.

Interviewer: *"[T]he four pillars...is that something that's quite central to CPD with you?"*

CLP1: *"I wouldn't say so, to be honest. I think we just more...focus on making sure people are up to date with what they're actually doing on a day-to-day basis."*

A more pragmatic concern among all CLs, meanwhile, was the immediacy of sonographer replacement, something underscored by **CLP2:**

"[W]e've got...a fairly decent percentage of [sonographers] that are going to retire which will mean that we will have to get people to start moving towards doing more advanced roles, and...hopefully it won't be...the brand-new junior staff that we'll be trying to bring up into the higher [advanced practice] roles."

This was seen as a major threat to the efficacy of the profession in general; the loss of key expertise without sufficient numbers of more experienced sonographers ready

to move into advanced roles. It was here that universities were thought to have a particularly strong potential role, in promoting and delivering targeted and responsive CPD.

Finally, it was noted with respect to several key themes and subthemes that today's starting sonographers, irrespective of educational pathway, often struggled with grasping the broader contexts of medicine and pragmatic medical practice. This produced problems with report writing and working in multi-disciplinary teams at the very least, and was an area in which key educational interventions were seen to be key in developing practitioners ready to engage with an AP pathway at an earlier stage.

As noted above, the data addressed in this report were collected prior to the publication of the *Preceptorship and Capability Development Framework for Sonographers* (British Medical Ultrasound Society, 2022), and the *updated CASE Standards for Sonographic Education* (Consortium for the Accreditation of Sonographic Education, 2022). This to some extent influenced the research/instrument design itself, and there was certainly no direct questioning included about preceptorship, for example, which has more recently become an issue of considerable research and policy interest (Hill and White, 2023; British Medical Ultrasound Society, 2022). This said, the interviews were very open in both structure and style, and matters such as preceptorship seldom arose in the data any more than did research (which is a full pillar of Advanced Practice). In short, matters that do not feature heavily in the analysis above did not emerge as particularly salient issues for participants *at that time*.

4.1. Recommendations

With a view to the above, the following steps and adaptations are recommended, with respect to the character of the data themselves:

1. There is a need for greater national clarity regarding the competencies and levels of capability that define Advanced Practice, as well as the graduate, enhanced, and consultant stages.
2. The concept of the four pillars of AP needs to be more extensively familiarised and clarified within the sonography workforce, not least for clinical managers, to ensure it can be appropriately applied to clinical practice.
3. A greater emphasis on developing sonographers' advanced communication skills is needed in both the HEI and clinical settings. This includes sonographers (a) verbally breaking unexpected scan findings to patients, and also (b) developing the required skills to write complex clinical reports to convey normal and abnormal scan findings to referring clinicians, often recommending further referrals.
4. Opportunities to develop leadership skills are needed both within the HEI programmes and locally in ultrasound departments to allow sonographers to demonstrate this pillar of AP.
5. Opportunities to develop additional and/or more specialised areas of clinical practice are already available through many ultrasound programmes, via the completion of additional clinical modules. More emphasis is, however, needed on local training and development opportunities to facilitate sonographers taking-up additional learning opportunities.
6. The overarching sonography workforce shortage remains highly problematic; attempts to move forward by allowing the existing workforce to develop skills

in AP are often hampered by the requirement to prioritise the daily 'bread and butter' workload. Solving (or at least easing) the current sonography workforce crisis should help to facilitate more experienced sonographers to develop within AP framework.

A number of the above recommendations have been developed in research literature and guidance published since these data were originally collected, not least around reporting quality/clarity, CPD and teamworking/interpersonal skills (Consortium for the Accreditation of Sonographic Education, 2022; Hill and White, 2023; British Medical Ultrasound Society, 2022). This underscores not only their ongoing importance, but also that (at time of writing) the concerns of Clinical Leads in UK ultrasound have not been going unheard.

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Appendix 1: Interview Schedule

1. Confirm consent and fill tracking sheet with participant.

2. To what extent would you say current postgraduate ultrasound education is 'doing its job' in producing competent, workplace-ready sonographers? Explore the rationale for their answer, requesting concrete examples wherever possible. Prompt on:

- In what ways are the new practitioners typically fully prepared for the workplace?
- What are they often lacking?
- What specific changes would you say are needed at this moment?

3. What major changes to the role of a new sonographer do you see emerging in the short to medium terms (up to five years), given changes in the UK population and the healthcare system itself? Explore the rationale for their answer, requesting concrete examples wherever possible. Prompt on:

- Organisational change;
- Range of procedures/skills necessary;
- Overall workload;
- Profile of patients;
- Attitude of patients.

4. What would you like to see done in ultrasound education to pre-empt these changes? Explore the rationale for their answer, requesting concrete examples wherever possible. Prompt on:

- New models of teaching?
- New placement systems?
- New topics/skills to learn?

5. Are there currently sufficient CPD opportunities available to your staff to develop the four pillars of advanced practice (essential for accredited AP status)? Explore the rationale for their answer, requesting concrete examples wherever possible.

Prompt on:

- What additional training do 'new sonographers' typically require to develop advanced practice?*
- What additional CPD modules are needed?
- How do you feel higher education institutions (HEI's) might help with this?

Prompt also on:

- What barriers exist to engagement with this staff development?
- Are staff generally enthused about developing advanced practice?
 - If not, why not?

6. How do you see the CPD framework changing for sonographers over the next five years in order to support progress towards accredited AP status? Explore the rationale for their answer, requesting concrete examples wherever possible. Prompt on:

- What additional training do you envisage 'new sonographers' will require to develop their advanced practice?
- What additional CPD modules do you think will be needed?
- How do you feel higher education institutions (HEI's) can help with this?

*Clinical Practice; Facilitating Learning; Leadership; and Evidence, Research and Development.

Appendix 2: Information and Consent

Future-Proofing Education for Advanced Practitioners in Ultrasound:

Participant Information Sheet

About the study

The study, funded by Health Education England (HEE), aims to explore how current models and mechanisms involved in Ultrasound Advanced Practitioner (AP) education, at UK University Level 7, will need to change to adapt to (a) the challenges of a rapidly changing public healthcare environment, and (b) co-existence with the newer 'direct entry' educational routes into ultrasound that are now coming online across the UK.

Why have you asked me to take part and what will I be required to do?

You are a Clinical Lead in a UK ultrasound department with at least two years of experience in that role. As such, you are well-positioned to comment on the study's topic. You will be asked to sit for a telephone interview on the issues, at a time entirely of your choosing. This interview should take approximately 30 minutes, but the exact duration will, of course, depend on your answers.

What if I do not wish to take part or change my mind during the study?

Your participation in the study is entirely voluntary. You are free to withdraw from the study at any time without having to provide a reason for doing so; this also means

you will be able to withdraw from the study (without reason given) during the interview or immediately after it.

What happens to the research data?

Your interview will be transcribed verbatim, but all potentially personal data – particularly specific references to people and places - will be redacted during this process. As such, although the project outputs will use direct data (i.e. redacted quotations) only an individual who already knows your specific experience would possibly be able to identify you from this. On the attached consent form, you will be given a further set of precise options regarding how your original (recorded) and transcribed (redacted) data can be handled. All original voice data will be held securely, shared with nobody outside the research team and securely destroyed by April 2020 at the very latest.

How will the research be reported?

The research will be reported in (a) a formal report for HEE, (b) conference papers and (c) international peer-reviewed publications. You will be sent an executive summary of the former, and subsequently invited to discuss any questions you might have with the research team.

How can I find out more information?

Please contact: Dr. Paul. K. Miller, Associate Professor of Social Psychology, University of Cumbria. Paul.miller@cumbria.ac.uk

Future-Proofing Education for Advanced Clinical Practitioners in Ultrasound:

Participant Information Sheet

Please answer the following questions by circling your responses:

Have you read and understood the information sheet about this study? YES NO

Have you been able to ask questions and had enough information? YES NO

Do you understand that you are free to withdraw from this study at any time, and without having to give a reason for withdrawal? YES NO

Your responses will be redacted of personal information. Do you give permission for members of the research team to quote your redacted responses in formal outputs?

YES NO

Do you give permission for your redacted transcript to be publicly archived, such that other researchers might use it to help future research? If 'NO', the redacted transcript will remain seen only by the research team. YES NO

Please sign below if you wish to take part in the research and feel you have had enough information about what is involved:

Appendix 3: Interview Précis

Dear [participant],

Your interview will cover four broad areas, these being:

1. The current situation in UK ultrasound education.
 - a. The degree to which postgraduate ultrasound education is currently 'doing its job' in producing competent, workplace-ready sonographers.
 - b. Changes to this provision that are currently needed.

2. The immediate future.
 - a. The major changes to the role of a new sonographer that you see emerging in the next five years, given likely changes in the UK population and the healthcare system itself.
 - b. What ultrasound education and educators might do to pre-empt these changes and better prepare sonographers.

3. CPD now.
 - a. The kinds of CPD available for sonographers working towards AP.
 - b. Shortfalls.
 - c. Barriers to engagement with CPD.

4. CPD in the immediate future.

- a. The CPD models and topics that will likely be necessary over the next five years.
- b. How Higher Education Institutions might best support these.